IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of:	:	
Dean P. Swoboda et al.	:	Examiner: M.A. Patterson
U.S. Serial No. 10/004,874	:	Group Art Unit: 1772
Filed December 7, 2001	:	
Docket No. 2251 (FJ-00-9)	:	
For: HIGH GLOSS DISPOSABLE PRESSWARE	:	

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Mail Stop Appeal Brief - Patents
Commissioner for Patents
P.O. Box 1450
Alexandria, Virginia 22313-1450

BRIEF ON APPEAL

Sir:

Applicant submits herewith, in triplicate, its *Appeal Brief* in the above-noted United States Patent Application. This *Appeal* is from the *Final Rejection* of September 23, 2003. A *Notice of Appeal* was submitted on January 22, 2004. Please charge the fee for the *Brief*, as well as any other fees due in this case to our Deposit Account No. 50-0935. If any extensions of time are required, please consider this paper a *Petition* therefore and charge our account as aforesaid.

1. REAL PARTY IN INTEREST

Georgia-Pacific Corporation, 133 Peachtree Street, N.E., Atlanta, Georgia 30303-1847 is the real party in interest in this patent application. The *Assignment* was recorded at Reel 012357 / Frame 0736 on December 7, 2001.

2. RELATED APPEALS AND INTERFERENCE

There are no related appeals or interferences known to Applicant or its legal representatives which will affect or be affected by or having a bearing on the Board's decision in this case.

3. STATUS OF CLAIMS

Claims 1-16, 21-29 and 36-37 as amended on July 1, 2003 are on Appeal. The following claims have been withdrawn from consideration and are not on appeal for purposes of this proceeding: Claims 17-20, 30-35 and 38-44. A complete listing of the *Claims on Appeal* is provided in Appendix A hereto.

4. STATUS OF AMENDMENTS

Proposed amendments *After Final* filed on November 14, 2003 have not been entered. A request to reconsider withdrawal of prior versions of Claims 38-44 filed on November 7, 2003 was declined. For purposes of this *Appeal*, the claims stand as appearing in Appendix A.

5. SUMMARY OF INVENTION

The present invention relates to disposable paper plates and the like made in a pressware die set. Applicant, Georgia-Pacific Corporation, a major supplier of these products through its Dixie® division has found that an SBR/Acrylic topcoat provides surprising surface gloss, a highly desirable feature. Claim 1 is illustrative:

> A disposable shaped paperboard food container with a bilayer finish press-formed in a heated die set from a paperboard blank,

said paperboard blank being prepared from a paperboard substrate provided with a first finish coating layer consisting essentially of a styrene-butadiene resin composition and a second, top coating finish layer consisting essentially of an acrylic resin composition applied to said first finish coating layer wherein said first and second coatings contain up to about 2 lbs of mineral filler per 3,000 square foot ream and, wherein said food container exhibits a surface gloss of at least about 40 gloss units as measured by test method ASTM D523-89, 60 degree method.

The unexpected results are perhaps best seen in Table 3 of the Application as filed, p. 18:

Table 3 – Comparison of Gloss SBR/Acrylic vs. Acrylic/Acrylic

Example	Base Finish Coat Type	Base Finish Coat Amount #/rm	Top Finish Coat Type	Top Coat Amount #/rm	Gloss 60 Degree, units Average
4	Existing Acrylic	0.61	Existing Acrylic (Control)	0.57	31
5	Tykote	0.73	Cork 6979a	0.56	55
6	Existing Acrylic	0.61	Existing Acrylic (Control)	0.61	29
7	Tykote	0.81	Michelman 706	0.60	57

As can be seen from the foregoing Table 3, the bilayer SBR undercoat/Acrylic uppercoat (Invention Examples 5 and 7) was nearly 100% glossier than corresponding Acrylic/Acrylic bilayer topcoats. This is directly contrary to the relevant teachings of United States Patent No. 5,776,619 of *Shanton* which shows SBR coatings having among the lowest gloss values.

6. <u>ISSUES</u>

a) Whether or not the transitional phrase "consisting essentially of" renders the independent claims indefinite within the meaning of 35 USC §112, second paragraph;

b) Whether or not United States Patent No. 5,776,619 to *Shanton* renders the claimed subject matter *prima facie* obvious within the meaning of 35 USC §103; and

c) Whether or not the unexpected results support a conclusion of patentability in any event.

7. <u>GROUPING OF CLAIMS</u>

For the purposes of this Appeal:

Claims 1, 3, 4-13, 16-21, 23-29, 36 and 37 stand or fall together;

Claim 2 is independently patentable; and

Claims 14, 15 and 22 stand or fall together.

All claims are believed patentable.

8. <u>ARGUMENT</u>

Turning first to the §112, second paragraph rejections, it is believed that use of the phrase "consisting essentially of" to describe a composition including a resin and up to about 2 lbs of mineral filler per 3,000 square foot ream is entirely proper. Terminology such as "substantially" consisting essentially of and so forth are by their very nature imprecise; nevertheless, such claim terminology is permissible, indeed expressly provided for in MPEP §2111.03:

> **2111.03 Transitional Phrases**
>
> The transitional phrase "consisting essentially of" limits the scope of a claim to the specified materials or steps "and those that do not materially affect the basic and novel characteristic(s)" of the claimed invention. *In re Herz*, 537 F.2d 549, 551-52, 190 USPQ 461, 463 (CCPA 1976) (emphasis in

original) (Prior art hydraulic fluid required a dispersant which appellants argued was excluded from claims limited to a functional fluid "consisting essentially of" certain components. In finding the claims did not exclude the prior art dispersant, the court noted that appellants' specification indicated the claimed composition can contain any well-known additive such as a dispersant, and there was no evidence that the presence of a dispersant would materially affect the basic and novel characteristic of the claimed invention. The prior art composition had the same basic and novel characteristic (increased oxidation resistance) as well as additional enhanced detergent and dispersant characteristics.). "A 'consisting essentially of' claim occupies a middle ground between closed claims that are written in a 'consisting of' format and fully open claims that are drafted in a 'comprising' format." *PPG Industries v. Guardian Industries*, 156 F.3d 1351, 1354, 48 USPQ2d 1351, 1353-54 (Fed. Cir. 1998). See also *Atlas Powder v. E.I. duPont de Nemours & Co.*, 750 F.2d 1569, 224 USPQ 409 (Fed. Cir. 1984); *In re Janakirama-Rao*, 317 F.2d 951, 137 USPQ 893 (CCPA 1963); *Water Technologies Corp. vs. Calco, Ltd.*, 850 F.2d 660, 7 USPQ2d 1097 (Fed. Cir. 1988). For the purposes of searching for and applying prior art under 35 U.S.C. 102 and 103, absent a clear indication in the specification or claims of what the basic and novel characteristics actually are, "consisting essentially of" will be construed as equivalent to "comprising." See, e.g., *PPG*, 156 F.3d at 1355, 48 USPQ2d at 1355 ("PPG could have defined the scope of the phrase 'consisting essentially of' for purposes of its patent by making clear in its specification what it regarded as constituting a mate-rial change in the basic and novel characteristics of the invention."). See also *In re Janakirama-Rao*, 317 F.2d 951, 954, 137 USPQ 893, 895-96 (CCPA 1963). If an applicant contends that additional steps or materials in the prior art are excluded by the recitation of "consisting essentially of," applicant has the burden of showing that the introduction of additional steps or components would materially change the characteristics of applicant's invention. *In re De Lajarte*, 337 F.2d 870, 143 USPQ 256 (CCPA 1964). See also *Ex parte Hoffman*, 12 USPQ2d 1061, 1063-64 (Bd. Pat. App. & Inter. 1989) ("Although 'consisting essentially of' is typically used and defined in the context of compositions of matter, we find nothing intrinsically wrong with the use of such language as a modifier of method steps. . . [rendering] the claim open only for the inclusion of steps which do not materially affect the basic and novel characteristics of the claimed method. To determine the steps included versus excluded the claim must be read in light of the specification. . . . [I]t is an applicant's burden to establish that a step practiced in a prior art method is excluded from his claims by 'consisting essentially of' language.").

"Consisting essentially of" can certainly be used to define a composition having more than one component especially here where the phrase is further explained in the application

as filed. Unfilled topcoat layers are a preferred embodiment; however, some amount of filler could be employed as is noted on pages 4-5 of the application as filed:

> The first finish coating composition consists essentially of a styrene-butadiene resin composition that includes a styrene-butadiene resin, crosslinking agents and so forth, but does not include a substantial amount of mineral fillers which would alter the basic and novel characteristics of the invention, i.e., enhanced gloss, increased wet and dry rigidity and reduced moisture pickup. Preferably, the styrene-butadiene resin composition contains no mineral filler whatsoever. Likewise, the acrylic resin composition forming the second or top finish layer includes an acrylic resin, crosslinking agents and so forth, but does not include substantial amounts of mineral filler which would alter the basic and novel characteristics of the present invention. Preferably, the acrylic resin composition contains no mineral filler whatsoever; in some embodiments, however, it may be possible to add up to about 2 lbs of mineral filler per 3,000 square foot ream in the two finish layers while maintaining enhanced gloss and performance characteristics.

Applicant is entitled to so claim the invention. Nothing indefinite is seen whatsoever, especially in view of the specification definition. *See Hoechst Celanese* v. *BP Chemicals* 38 USPQ2d 1126, 1130 (CAFC 1996).

Turning to the rejections made on art, the obviousness rejections are not supported by *Shanton* '619 which in fact teaches away from the invention at several parts of the reference, for example, at Col. 4, lines 49 and following where the reference states that SBR coatings are inferior:

> Several different polymer formulations were investigated for forming the latex portion of the coating composition of the present invention. A polyvinyl acetate/acrylate polymer latex in the top coat and a <u>styrene butadiene latex</u> in the base coat currently used in a packaging grade application were tested, <u>but were found to produce a plate coating with poor plate properties, especially grease resistance</u>.

See also, Table 2, Col. 8 of *Shanton* '619 wherein it is seen that the SBR resin, GENCORP 5124M gave gloss values among the lowest; well below 40 at 60 degrees as is claimed. In this regard, *note* the *Declaration of Dean P. Swoboda* (Appendix B hereto, paragraph 9) compares the gloss values at 75 degrees reported for SBR with correlated values at 60

degrees and concludes the SBR containing coatings reported by *Shanton* '619 had gloss values of less than 25 at 60 degrees, well below the claimed range for Acrylic/SBR coatings of the present invention.

The low gloss values of less than 25 taught for SBR by *Shanton* '619 teach away from the invention, where it was unexpectedly found that substitution of an SBR layer for an acrylic layer greatly increased surface gloss.

The *Shanton* '619 patent also teaches 4 to 12 lbs of coatweight for each layer, Col. 4, lines 8-14 having 80 percent or more mineral filler as is seen in Examples 1 and 2 (Col. 9). There is accordingly specified by the reference much more than the of 2 lbs of mineral filler per ream claimed here, upwards of six (6) lbs and as much as twenty (20) lbs or so according to a fair reading of *Shanton* '619. Here again, the reference teaches away from the invention.

All claims should be allowed because *Shanton* '619 does not support, *prima facie*, a conclusion of obviousness. Shanton '619 teaches not to use SBR and to use more than 2 lbs of mineral filler per 3,000 square feet ream. Both of these teachings are at odds with the claimed subject matter which is directed to a glossy topmost bilayer. It is noted in *In re Geisler* 43 USPQ2d 1362, 1365 (CAFC 1997) that even a *prima facie* case of obviousness is rebutted if it is shown that the art teaches away in any material respect. It is further noted in *Geisler* is that the existence of unexpected properties in the range claimed rebut a *prima facie* case. *Geisler* at 43 USPQ2d 1365.

Furthermore, it is well settled that modifications to the prior art must come from the prior art for purposes of making claimed subject matter obvious.

In this regard, it was noted in the *Schenck* case, 218 USPQ 698 (CAFC 1983) that modifications unwarranted by the references themselves is improper:

> If "rigidly fixed base structure" be read as encompassing its plate, says Nortron, it is equally readable on certain elements of the Rouy '654 prior art

> patent. That argument, however, turns on a conjectural modification of the disclosure of the '654 patent. Modification unwarranted by the disclosure of a reference is improper. See In re Imperato, 486 F.2d 585, 587, 179 USPQ 730, 732 (CCPA 1973); In re Beigel, 292 F.2d 955, 130 USPQ 206 , (CCPA 1961). In its modification, Nortron labels the outer end portions of what Rouy calls "flexible connections" as "base plates" and adds numerical designations to them. There is no justification for that modification. Rouy did not regard or describe those end portions as base plates; nor did he describe them in any manner; nor did he disclose their dimension in the direction of his shaft axis. The Rouy '654 patent, disclosing a support structure with gaps and numerous other differences from the structure claimed in the '511 patent, has little if any relevance, as was apparently recognized by the examiner in the Patent and Trademark Office who cited the '654 patent, but did not apply it to the claims.

Schenck v. *Norton*, 218 USPQ 698, 702 (CAFC 1983). *See also In re Gordon et al.*, 221 USPQ 1125 (CAFC 1984) as well as MPEP §2143.02, last heading:

> **THE PROPOSED MODIFICATION CANNOT CHANGE THE PRINCIPLE OF OPERATION OF A REFERENCE**
>
> If the proposed modification or combination of the prior art would change the principle of operation of the prior art invention being modified, then the teachings of the references are not sufficient to render the claims *prima facie* obvious. *In re Ratti*, 270 F.2d 810, 123 USPQ 349 (CCPA 1959) (Claims were directed to an oil seal comprising a bore engaging portion with outwardly biased resilient spring fingers inserted in a resilient sealing member. The primary reference relied upon in a rejection based on a combination of references disclosed an oil seal wherein the bore engaging portion was reinforced by a cylindrical sheet metal casing. Patentee taught the device required rigidity for operation, whereas the claimed invention required resiliency. The court reversed the rejection holding the "suggested combination of references would require a substantial reconstruction and redesign of the elements shown in [the primary reference] as well as a change in the basic principle under which the [primary reference] construction was designed to operate. 270 F.2d at 813, 123 USPQ at 352.).

Here, there is no suggestion of the claimed glossy finish bilayer coating of Acrylic/SBR coating with less than 2 lbs of filler per ream in the art.

Even if a *prima facie* case were made out, the *Declaration of Dean P. Swoboda* is believed sufficient for patentability in any event. Note paragraphs 6 and 7, repeated below:

6. On the other hand, coatings of the invention typically have no filler at all (but may contain some in some embodiments) and exhibit gloss values that are unexpectedly high, as is seen in Tables 2 and 3 at page 18 of the above-noted patent application as filed:

Table 2 – Comparison of Gloss SBR/Acrylic vs. Acrylic/Acrylic

Example	Base Coat Type	Base Finish Coat Amount #/rm	Top Finish Coat Type	Top Coat Amount #/rm	Gloss 60 Degree, units Die positions 1-5 Average (Std. Dev)
1	Existing Acrylic	0.55	Existing Acrylic (Control)	0.50	25 (1.5)
2	Tykote	0.55	Michelman 706	0.60	50 (1.3)
3	Tykote	0.35	Cork 6979a	0.61	31 (2.7)

Table 3 – Comparison of Gloss SBR/Acrylic vs. Acrylic/Acrylic

Example	Base Finish Coat Type	Base Finish Coat Amount #/rm	Top Finish Coat Type	Top Coat Amount #/rm	Gloss 60 Degree, units Average
4	Existing Acrylic	0.61	Existing Acrylic (Control)	0.57	31
5	Tykote	0.73	Cork 6979a	0.56	55
6	Existing Acrylic	0.61	Existing Acrylic (Control)	0.61	29
7	Tykote	0.81	Michelman 706	0.60	57

7. As is seen in Tables 2 and 3, gloss values of 50 or more at 60 degrees are readily achieved with the invention. This is a surprising result which is not remotely suggested by *Shanton* '619 as further discussed below. It is further noted that the controls of the same paperboard are under 30 gloss units at 60 degrees.

The increase in gloss seen with the invention coatings over the controls is nearly 100 percent. An unexpected and highly useful result.

Such results warrant allowance in this case.

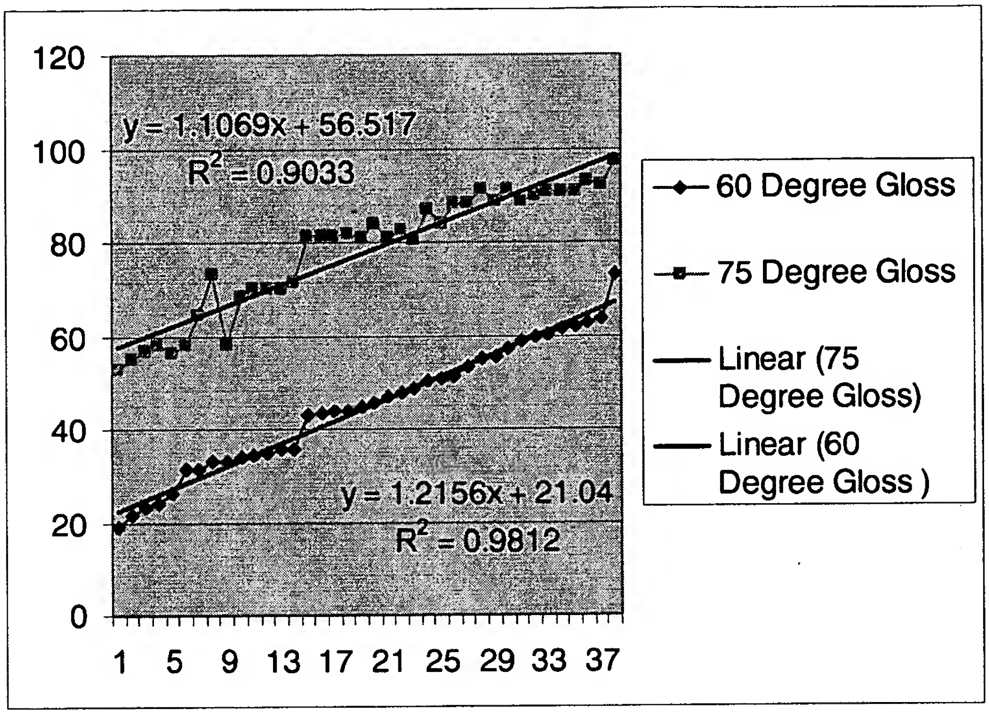
It was noted in *In re Soni,* 34 USPQ2d 1684, 1687 and following (CAFC 1995), uncontradicted Declaration evidence of unexpected results ordinarily suffices for purposes of nonobviousness:

> Mere improvement in properties does not always suffice to show unexpected results. In our view, however, when an applicant demonstrates substantially improved results, as Soni did here, and states that the results were unexpected, this should suffice to establish unexpected results in the absence of evidence to the contrary. Soni, who owed the PTO a duty of candor, made such a showing here. The PTO has not provided any persuasive basis to question Soni's comparative data and assertion that the demonstrated results were unexpected. Thus, we are persuaded that the Board's finding that Soni did not establish unexpected results is clearly erroneous.
> The cases cited by the dissent are not to the contrary. Neither De Blauwe, nor Wood, nor Lindner requires a showing of unexpectedness separate from a showing of significant differences in result. Nor does Merck, which involved compositions understood to differ only in "a matter of degree." Those are not the facts here, where substantially improved properties were shown. Given a presumption of similar properties for similar compositions, substantially improved properties are ipso facto unexpected. The difficulty postulated by the dissent in distinguishing substantial from insubstantial improvement is no greater than the PTO and the courts have encountered, successfully, for many years in making judgments on the question of obviousness. It is not unworkable; it is simply the stuff of adjudication. Nor does it change established burdens of proof. The PTO here established a prima facie case, the applicant responded to it with a showing of data, and the PTO made an inadequate challenge to the adequacy of that showing.

Claim 1 and the other claims grouped therewith are believed patentable because of the reasons set forth above.

Claim 2 is directed to embodiments having gloss values of 50 or more. The *Shanton* '619 reference does not achieve such high gloss values with any composition, even with highly-filled Acrylic/Acrylic systems which are not believed relevant to the claimed subject matter for the reasons noted above. The maximum value reported in the reference was "... no more than 45..." gloss units at 60 degrees. *Declaration of Dean P. Swoboda*, ¶9:

9. In order to compare 75 degrees and 60 degrees gloss values, I compared data from a variety of sources and found a correlation to be as set forth below:



It is seen from the graph that a gloss value of about 75 at 75 degrees is roughly equivalent to a gloss value of about 40 at 60 degrees. Thus, even in a very different highly filled system, *Shanton* '619 does not achieve gloss values of more than 45 at 60 degrees. Gloss values of 64.8 and 53.1 at 75 degrees (last entry, Table 2 of *Shanton* '619) for the highly filled styrene/butadiene coating correspond to gloss values at 60 degrees of less than 25 based on the above data (about 23.5 and 10.65 based on the linear correlation).

Claims 14, 15 and 22 are directed to containers and paperboard that has a clay undercoat which is then coated with the SBR and Acrylic topcoats. *Shanton* '619 contains no disclosure or suggestion of the claimed multilayer structure.

For all of the above reasons, Claims 1-16, 21-29 and 36-37 should be allowed.

Respectfully submitted,

Michael W. Ferrell

Michael W. Ferrell
Attorney for Applicant
Reg. No. 31,158

Ferrells, PLLC
P.O. Box 312
Clifton, Virginia 20124-1706
Telephone: (703) 968-8600
Facsimile: (703) 968-5500
April 22, 2004

APPENDIX A
Claims 1-16, 21-29 and 36-37

1. A disposable shaped paperboard food container with a bilayer finish press-formed in a heated die set from a paperboard blank,

   said paperboard blank being prepared from a paperboard substrate provided with a first finish coating layer consisting essentially of a styrene-butadiene resin composition and a second, top coating finish layer consisting essentially of an acrylic resin composition applied to said first finish coating layer wherein said first and second coatings contain up to about 2 lbs of mineral filler per 3,000 square foot ream and, wherein said food container exhibits a surface gloss of at least about 40 gloss units as measured by test method ASTM D523-89, 60 degree method.

2. The paperboard food container according to Claim 1, wherein said food container exhibits a surface gloss of at least about 50 gloss units as measured by test method ASTM D523-89, 60 degree method.

3. The paperboard food container according to Claim 1, wherein said food container exhibits a surface gloss of between about 45 gloss units and about 65 gloss units as measured by test method ASTM D523-89, 60 degree method.

4. The paperboard food container according to Claim 1, wherein said styrene-butadiene resin composition and said acrylic resin composition are aqueous emulsions.

5. The paperboard food container according to Claim 1, wherein said first finish coating layer is applied to said paperboard substrate in an amount of from about 0.25 pounds to about 1.5 pounds per 3,000 square foot ream.

6. The paperboard food container according to Claim 5, wherein said first finish coating layer is applied to said paperboard substrate in an amount of at least about 0.5 pounds per 3,000 square foot ream.

7. The paperboard food container according to Claim 6, wherein said first finish coating layer is applied to said paperboard substrate in an amount of from about 0.6 pounds to about 1 pound per 3,000 square foot ream.

8. The paperboard food container according to Claim 1, wherein said second top finish coating layer is applied to said paperboard substrate in an amount of at least about 0.5 pounds per 3,000 square foot ream.

9. The paperboard food container according to Claim 1, wherein said second top finish coating layer is applied to said paperboard substrate in an amount of from about 0.25 pounds to about 1 pound per 3,000 square foot ream.

10. The paperboard food container according to Claim 1, wherein said styrene-butadiene resin composition comprises a carboxylated styrene-butadiene resin.

11. The paperboard food container according to Claim 1, wherein said paperboard substrate has a basis weight of from about 100 to about 300 pounds per 3,000 square foot ream.

12. The paperboard food container according to Claim 11, wherein said paperboard substrate has a basis weight of from about 125 pounds to about 150 pounds per 3,000 square foot ream.

13. The paperboard food container according to Claim 11, wherein said paperboard substrate has a basis weight of from about 150 to about 200 pounds per square foot ream.

14. The paperboard food container according to Claim 1, wherein said paperboard substrate is sized with a starch composition in an amount of from about 4 to about 15 pounds per 3,000

square foot ream and provided with a clay coating prior to being coated with said first finish coating layer.

15. The paperboard food container according to Claim 14, wherein said paperboard substrate is coated with one or more clay coatings in a coatweight amount of from about 8 lbs of clay coating per 3,000 square foot ream to about 24 lbs of clay coating per 3,000 square foot ream underneath with said first and second finish coating layers.

16. The paperboard food container according to Claim 1, wherein the forming surfaces of said heated die set are maintained at a temperature of from about 250° F to about 400° F during pressing of said container.

21. A coated paperboard for making a paperboard food container with a bilayer finish wherein said container exhibits a surface gloss of at least about 40 gloss units as measured by test method ASTM D523-89, 60 degree method, said coated paperboard comprising:

a) a paperboard substrate sized with from about 4 pounds of starch per 3,000 square foot ream to about 15 pounds of starch per 3,000 square foot ream and provided with a clay coating;

b) a first finish coating layer consisting essentially of a styrene – butadiene resin composition applied to said clay coating; and

c) a second finish top coat layer consisting essentially of an acrylic resin composition applied to said first layer wherein said first and second finish coatings contain up to about 2 lbs of mineral filler per 3,000 square foot ream.

22. The coated paperboard according to Claim 21, wherein said paperboard substrate is coated with one or more clay coatings in a coatweight amount of from 8 lbs of clay coating to about 24 lbs of clay coating per 3,000 square foot ream underneath said first finish coating layer and said second finish top coat layer.

23. The coated paperboard food container according to Claim 21, wherein said styrene-butadiene resin composition and said acrylic resin composition are aqueous emulsions.

24. The coated paperboard according to Claim 21, wherein said first finish coating layer is applied to said paperboard substrate in an amount of from about 0.25 pounds to about 1.5 pounds per 3,000 square foot ream.

25. The coated paperboard according to Claim 24, wherein said first finish coating layer is applied to said paperboard substrate in an amount of at least about 0.5 pounds per 3,000 square foot ream.

26. The coated paperboard according to Claim 25 wherein said first finish coating layer is applied to said paperboard substrate in an amount of from about 0.6 pounds to about 1 pound per 3,000 square foot ream.

27. The coated paperboard according to Claim 21, wherein said second top finish coating layer is applied to said paperboard substrate in an amount of at least about 0.5 pounds per 3,000 square foot ream.

28. The coated paperboard according to Claim 27, wherein said second top finish coating layer is applied to said paperboard substrate in an amount of from about 0.25 pounds to about 1 pound per 3,000 square foot ream.

29. The coated paperboard according to Claim 29, wherein said styrene-butadiene resin composition comprises a carboxylated styrene-butadiene resin.

36. The paperboard food container according to Claim 1, wherein said food container exhibits a surface gloss of 45 or more gloss units as measured by test method ASTM D523-89, 60 degree method.

37. The coated paperboard according to Claim 21, formed into a container exhibiting a surface gloss of 45 or more gloss units as measured by test method ASTM D523-89, 60 degree method.

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Mail Stop Amendment
Commissioner for Patents
P.O. Box 1450
Alexandria, Virginia 22313-1450

DECLARATION OF DEAN P. SWOBODA

Sir:

Dean P. Swoboda, first-named inventor in the above-noted patent application, hereby declares:

1. That he was educated in pulp and paper technology and holds a Bachelor's Degree in Operation Management from Marian College, Fond du Lac, Wisconsin. He has worked in connection with disposable paper products for 20 years and is familiar with the subject matter of the above-noted patent application as well as the Office Action dated March 28, 2003. He understands that the claims have been rejected on various grounds, including that certain terminology was objected to. That he has also been advised that the claims were rejected over United States Patent No. 5,776,619 to *Shanton*, with which he is also familiar.

2. That with respect to terminology such as "formed in a heated die set", "prepared from a paperboard blank" and so forth objected to in the Office Action, one of skill in the art would readily understand that language to refer to an article press-formed from paperboard stock. Equipment to form paperboard containers is likewise well known as detailed in pages 10-16 of the above-noted patent application. The process involves positioning a paper blank, which is typically planar, in a reciprocating heated die set and then pressing the container into shape under heat and mechanical pressure. The process is specifically illustrated in **Figures 3** and **4** of the above-noted patent application. One of skill in the art would understand the language because there are only two types of shaped disposable paper food containers – press-formed and pulp-molded. The claim language thus distinguishes one type of shaped paper container from the other. Adding language to the effect that the claimed articles are press-formed further reinforces the distinction.

3. That he further understands that the Examiner has objected to the reference to ASTM Test Method ASTM D-523-89 because it may change with time. That objection is believed unwarranted since the "89" is a version designation referring to the year the test method was adopted. *See* Exhibit 1 hereto which is a copy of "Search Tips" from the ASTM site. The last paragraph instructs a user <u>not</u> to enter the date if the most recent test method version is desired.

4. That he is attaching a copy of ASTM D523-89 hereto as Exhibit 2. He understands that this document will be made of record in this patent application and that upon issuance of the patent anyone desiring access to the file will also have access to the Exhibit 2 document.

5. With respect to the '619 patent, the reference is believed only of general interest because it relates to relatively highly filled, heavy coatweight clay coatings applied to paperboard, not finish coatings as are claimed in the above-noted patent application. In this respect, it is noted in Col. 4, lines 7 and following of *Shanton* '619 that each coat is applied in an amount of from 4 to 12 lbs. per 3000 square foot ream, an

aggregate of 8 to 24 lbs. Note also, Col. 9, Examples 1 and 2 of the *Shanton* '619 patent below, where it is seen the coatings consist predominantly (80%) of clay pigment and/or mineral filler.

EXAMPLE 1			
Base Coat			
Pigment:	Huber Hydrasperse (kaolin clay)	80	parts
	ECCI Carbital 35	20	parts
Latex:	BASF ACRONAL S504	20	parts
Dispersant:			
	Dispex N40	0.12	parts
Top Coat			
Pigment:	ECCI KAOCARB	100	parts
Latex:	BASF ACRONAL S504	19	parts
Dispersant:			

EXAMPLE 2			
Base Coat			
Pigment:	ECCI KAOCARB 5	100	parts
Latex:	Latex:		
Dispersant:			
	Dispex N40	0.1	parts
Top Coat			
Pigment:	ECCI KAOCARB 5	100	parts
Latex:	Latex		
Dispersant:			
	Dispex N40	0.1	parts

6. On the other hand, coatings of the invention typically have no filler at all (but may contain some in some embodiments) and exhibit gloss values that are unexpectedly high, as is seen in Tables 2 and 3 at page 18 of the above-noted patent application as filed:

Table 2 – Comparison of Gloss SBR/Acrylic vs. Acrylic/Acrylic

Example	Base Coat Type	Base Finish Coat Amount #/rm	Top Finish Coat Type	Top Coat Amount #/rm	Gloss 60 Degree, units Die positions 1-5 Average (Std. Dev)
1	Existing Acrylic	0.55	Existing Acrylic (Control)	0.50	25 (1.5)
2	Tykote	0.55	Michelman 706	0.60	50 (1.3)
3	Tykote	0.35	Cork 6979a	0.61	31 (2.7)

Table 3 – Comparison of Gloss SBR/Acrylic vs. Acrylic/Acrylic

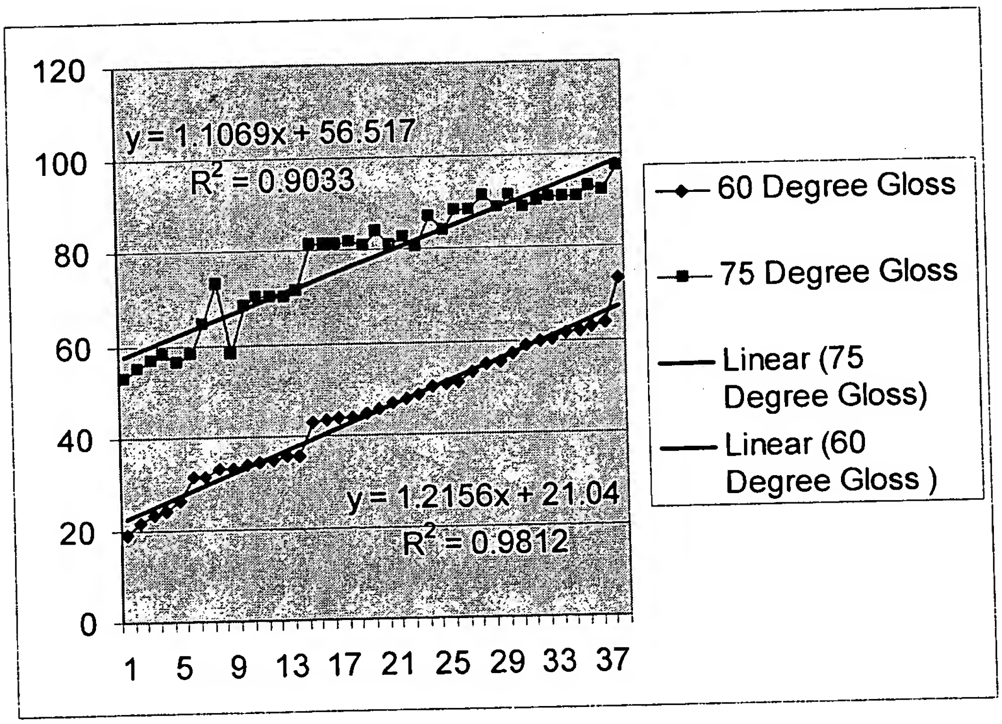
EXAMPLE	BASE FINISH COAT TYPE	Base Finish Coat Amount #/rm	TOP FINISH COAT TYPE	Top Coat Amount #/rm	Gloss 60 Degree, units Average
4	Existing Acrylic	0.61	Existing Acrylic (Control)	0.57	31
5	Tykote	0.73	Cork 6979a	0.56	55
6	Existing Acrylic	0.61	Existing Acrylic (Control)	0.61	29
7	Tykote	0.81	Michelman 706	0.60	57

7. As is seen in Tables 2 and 3, gloss values of 50 or more at 60 degrees are readily achieved with the invention. This is a surprising result which is not remotely suggested by *Shanton* '619 as further discussed below. It is further noted that the controls of the same paperboard are under 30 gloss units at 60 degrees.

8. *Shanton* '619 notes at Col. 4, lines 50 and following that coatings including styrene-butadiene resins formed poor barriers, especially with respect to grease. See also, Table 2 of *Shanton* '619, last entry, wherein a grease failure rate of 68% is reported for coatings including styrene-butadiene resins(defined as such in Col. 7, lines 58-

59). *Shanton* '619 does report gloss values at 75 degrees for a presumeably highly filled styrene-butadiene coating of 64.8 (machine direction) and 53.1 (cross machine direction) which values correspond to much less than 40 gloss units at 60 degrees, as discussed further below. Other, higher gloss coatings are also reported in Col. 8, Table 2 of *Shanton* '619. The maximum gloss value reported in *Shanton* '619 is 74.8 for the 75 degree method, machine direction.

9. In order to compare 75 degrees and 60 degrees gloss values, I compared data from a variety of sources and found a correlation to be as set forth below:



It is seen from the graph that a gloss value of about 75 at 75 degrees is roughly equivalent to a gloss value of about 40 at 60 degrees. Thus, even in a very different highly filled system, *Shanton* '619 does not achieve gloss values of more than 45 at 60 degrees. Gloss values of 64.8 and 53.1 at 75 degrees (last entry, Table 2 of *Shanton* '619) for the highly filled styrene/butadiene coating correspond to gloss

values at 60 degrees of less than 25 based on the above data (about 23.5 and 10.65 based on the linear correlation).

10. The undersigned Declarant declares further that all statements made herein of his own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the subject application or any patent issuing thereon.

Dated 7/1/03

Dean P Swoboda

Dean P. Swoboda

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Designation: D 523 – 89 (Reapproved 1999)

Standard Test Method for Specular Gloss[1]

This standard is issued under the fixed designation D 523; the number immediately following the designation indicates the year of original adoption or, in the case of revision, the year of last revision. A number in parentheses indicates the year of last reapproval. A superscript epsilon (ε) indicates an editorial change since the last revision or reapproval.

This standard has been approved for use by agencies of the Department of Defense.

1. Scope

1.1 This test method covers the measurement of the specular gloss of nonmetallic specimens for glossmeter geometries of 60, 20, and 85° **(1-7)**.[2]

1.2 The values stated in inch-pound units are to be regarded as the standard. The values given in parentheses are for information only.

1.3 *This standard does not purport to address all of the safety concerns, if any, associated with its use. It is the responsibility of the user of this standard to establish appropriate safety and health practices and determine the applicability of regulatory limitations prior to use.*

2. Referenced Documents

2.1 *ASTM Standards:*

D 823 Practices for Producing Films of Uniform Thickness of Paint, Varnish, and Related Products on Test Panels[3]

D 3964 Practice for Selection of Coating Specimens for Appearance Measurements[3]

D 3980 Practice for Interlaboratory Testing of Paint and Related Materials[4]

D 4039 Test Method for Reflection Haze of High-Gloss Surfaces[3]

E 97 Test Method for Directional Reflectance Factor, 45-deg 0-deg, of Opaque Specimens by Broad-Band Filter Reflectometry[5]

E 430 Test Method for Measurement of Gloss of High-Gloss Surfaces by Goniophotometry[3]

3. Terminology

3.1 *Definitions:*

3.1.1 *relative luminous reflectance factor*—the ratio of the luminous flux reflected from a specimen to the luminous flux reflected from a standard surface under the same geometric conditions. For the purpose of measuring specular gloss, the standard surface is polished glass.

3.1.2 *specular gloss*—the relative luminous reflectance factor of a specimen in the mirror direction.

4. Summary of Test Method

4.1 Measurements are made with 60, 20, or 85° geometry **(8, 9)**. The geometry of angles and apertures is chosen so that these procedures may be used as follows:

4.1.1 The 60° geometry is used for intercomparing most specimens and for determining when the 20° geometry may be more applicable.

4.1.2 The 20° geometry is advantageous for comparing specimens having 60° gloss values higher than 70.

4.1.3 The 85° geometry is used for comparing specimens for sheen or near-grazing shininess. It is most frequently applied when specimens have 60° gloss values lower than 10.

5. Significance and Use

5.1 Gloss is associated with the capacity of a surface to reflect more light in some directions than in others. The directions associated with mirror (or specular) reflection normally have the highest reflectances. Measurements by this test method correlate with visual observations of surface shininess made at roughly the corresponding angles.

5.1.1 Measured gloss ratings by this test method are obtained by comparing the specular reflectance from the specimen to that from a black glass standard. Since specular reflectance depends also on the surface refractive index of the specimen, the measured gloss ratings change as the surface refractive index changes. In obtaining the visual gloss ratings, however, it is customary to compare the specular reflectances of two specimens having similar surface refractive indices. Since the instrumental ratings are affected more than the visual ratings by changes in surface refractive index, non-agreement between visual and instrumental gloss ratings can occur when high gloss specimen surfaces differing in refractive index are compared.

5.2 Other visual aspects of surface appearance, such as distinctness of reflected images, reflection haze, and texture, are frequently involved in the assessment of gloss **(1)**, **(6)**, **(7)**. Test Method E 430 includes techniques for the measurement of both distinctness-of-image gloss and reflection haze. Test

[1] This test method is under the jurisdiction of ASTM Committee E12 on Color and Appearance and is the direct responsibility of Subcommittee E12.03 on Geometry.

Current edition approved March 31, 1989. Published May 1989. Originally published as D 523 – 39 T. Last previous edition D 523 – 85$^{\epsilon 1}$.

[2] The boldface numbers in parentheses refer to the list of references at the end of this test method.

[3] *Annual Book of ASTM Standards*, Vol 06.01.

[4] Discontinued; see *1997 Annual Book of ASTM Standards*, Vol 06.01.

[5] Discontinued; see *1992 Annual Book of ASTM Standards*, Vol 14.02.

Method D 4039 provides an alternative procedure for measuring reflection haze.

5.3 Little information about the relation of numerical-to-perceptual intervals of specular gloss has been published. However, in many applications the gloss scales of this test method have provided discriminations between coated specimens that have agreed well with visual discriminations of gloss **(10)**.

5.4 When specimens differing widely in perceived gloss or color, or both, are compared, nonlinearity may be encountered in the relationship between visual gloss difference ratings and instrumental gloss reading differences.

6. Apparatus

6.1 *Instrumental Components*—The apparatus shall consist of an incandescent light source furnishing an incident beam, means for locating the surface of the specimen, and a receptor located to receive the required pyramid of rays reflected by the specimen. The receptor shall be a photosensitive device responding to visible radiation.

TABLE 1 Angles and Relative Dimensions of Source Image and Receptors

	In Plane of Measurement			Perpendicular to Plane of Measurement		
	θ,°	2 tan θ/2	Relative Dimension	θ,°	2 tan θ/2	Relative Dimension
Source image	0.75	0.0131	0.171	2.5	0.0436	0.568
Tolerance ±	0.25	0.0044	0.057	0.5	0.0087	0.114
60° receptor	4.4	0.0768	1.000	11.7	0.2049	2.668
Tolerance±	0.1	0.0018	0.023	0.2	0.0035	0.046
20° receptor	1.8	0.0314	0.409	3.6	0.0629	0.819
Tolerance ±	0.05	0.0009	0.012	0.1	0.0018	0.023
85° receptor	4.0	0.0698	0.909	6.0	0.1048	1.365
Tolerance±	0.3	0.0052	0.068	0.3	0.0052	0.068

6.2 *Geometric Conditions*—The axis of the incident beam shall be at one of the specified angles from the perpendicular to the specimen surface. The axis of the receptor shall be at the mirror reflection of the axis of the incident beam. The axis of the incident beam and the axis of the receptor shall be within 0.1° of the nominal value indicated by the geometry. With a flat piece of polished black glass or other front-surface mirror in the specimen position, an image of the source shall be formed at the center of the receptor field stop (receptor window). The length of the illuminated area of the specimen shall be not more than one third of the distance from the center of this area to the receptor field stop. The dimensions and tolerance of the source and receptor shall be as indicated in Table 1. The angular dimensions of the receptor field stop are measured from the receptor lens in a collimated-beam-type instrument, as illustrated in Fig. 1, and from the test surface in a converging-beam-type instrument, as illustrated in Fig. 2. See Fig. 1 and Fig. 2 for a generalized illustration of the dimensions. The tolerances are chosen so that errors in the source and receptor apertures do not produce an error of more than one gloss unit at any point on the scale **(5)**.

6.2.1 The important geometric dimensions of any specular-gloss measurement are:

6.2.1.1 Beam axis angle(s), usually 60, 20, or 85°.

6.2.1.2 Accepted angular divergences from principal rays (degree of spreading or diffusion of the reflected beam).

NOTE 1—The parallel-beam glossmeters possess the better uniformity of principle-ray angle of reflection, but the converging-beam glossmeters possess the better uniformity in extent of angular divergence accepted for measurement.

NOTE 2—*Polarization*—An evaluation of the impact of polarization on gloss measurement has been reported **(11)**. The magnitude of the polarization error depends on the difference between the refractive indices of specimen and standard, the angle of incidence, and the degree of polarization. Because the specimen and standard are generally quite similar optically, measured gloss values are little affected by polarization.

6.3 *Vignetting*—There shall be no vignetting of rays that lie within the field angles specified in Table 1.

6.4 *Spectral Conditions*—Results should not differ significantly from those obtained with a source-filter photocell combination that is spectrally corrected to yield CIE luminous efficiency with CIE source C. Since specular reflection is, in general, spectrally nonselective, spectral corrections need to be applied only to highly chromatic, low-gloss specimens upon agreement of users of this test method.

6.5 *Measurement Mechanism*—The receptor-measurement mechanism shall give a numerical indication that is proportional to the light flux passing the receptor field stop with

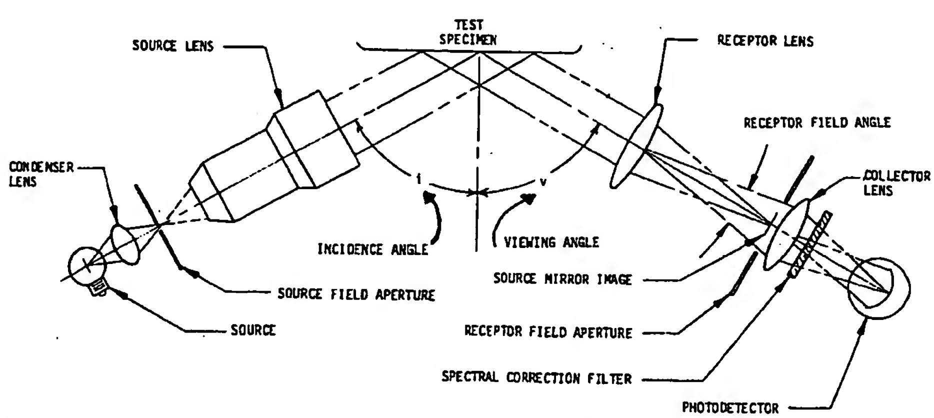

FIG. 1 Diagram of Parallel-Beam Glossmeter Showing Apertures and Source Mirror-Image Position

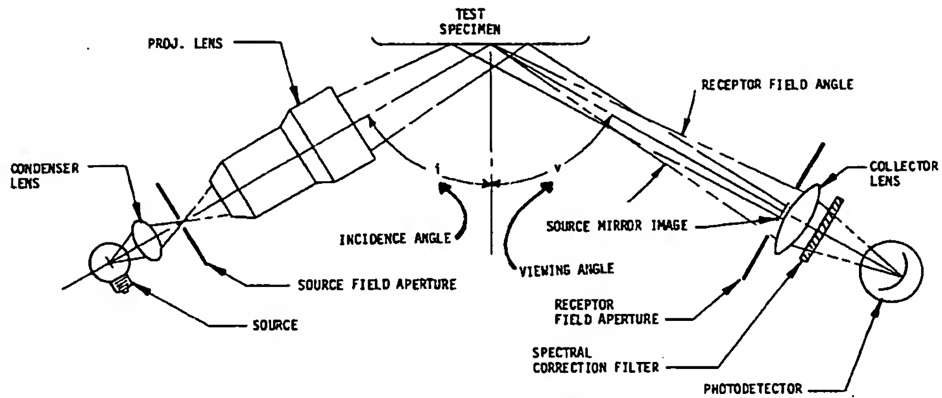

FIG. 2 Diagram of Converging-Beam Glossmeter Showing Apertures and Source Mirror-Image Position

±1 % of full-scale reading.

7. Reference Standards

7.1 *Primary Standards*—Highly polished, plane, black glass with a refractive index of 1.567 for the sodium D line shall be assigned a specular gloss value of 100 for each geometry. The gloss value for glass of any other refractive index can be computed from the Fresnel equation (**5**). For small differences in refractive index, however, the gloss value is a linear function of index, but the rate of change of gloss with index is different for each geometry. Each 0.001 increment in refractive index produces a change of 0.27, 0.16, and 0.016 in the gloss value assigned to a polished standard for the 20, 60, and 85° geometries, respectively. For example, glass of index 1.527 would be assigned values of 89.2, 93.6, and 99.4, in order of increasing geometry.

NOTE 3—Polished black glass has been reported to change in refractive index with time largely due to chemical contamination (**10**). The original values can be restored by optical polishing with cerium oxide. A wedge of high-purity quartz provides a more stable reference standard than glass.

7.2 *Working Standards*—Ceramic tile, depolished ground opaque glass, emery paper, and other semigloss materials having hard and uniform surfaces are suitable when calibrated against a primary standard on a glossmeter known to meet the requirements of this test method. Such standards should be checked periodically for constancy by comparing with primary standards.

7.3 Store standards in a closed container when not in use. Keep them clean and away from any dirt that might scratch or mar their surfaces. *Never* place standards face down on a surface that may be dirty or abrasive. Always hold standards at the side edges to avoid getting oil from the skin on the standard surface. Clean the standards in warm water and a mild detergent solution brushing gently with a soft nylon brush. (Do *not* use soap solutions to clean standards, because they can leave a film.) Rinse standards in hot running water (temperature near 150°F (65°C)) to remove detergent solution, followed by a final rinse in distilled water. *Do not wipe standards.* The polished black glass high-gloss standard may be dabbed gently with a lint-free paper towel or other lint-free absorbent material. Place the rinsed standards in a warm oven to dry.

8. Preparation and Selection of Test Specimens

8.1 This test method does not cover preparation techniques. Whenever a test for gloss requires the preparation of test specimens, use the procedures given in Practice D 823.

NOTE 4—To determine the maximum gloss obtainable from a test material, such as a paint or varnish, use Methods B or C of Practice D 823.

8.2 Select specimens in accordance with Practice D 3964.

9. Instrument Calibration

9.1 Operate the glossmeter in accordance with the manufacturer's instructions.

9.2 Verify the instrument zero by placing a black cavity in the specified position. If the reading is not within ±0.1 of zero, subtract it algebraically from subsequent readings or adjust the instrument to read zero.

9.3 Calibrate the instrument at the start and completion of every period of glossmeter operation, and during the operation at sufficiently frequent intervals to assure that the instrument response is practically constant. To calibrate, adjust the instrument to read correctly the gloss of a highly polished standard, properly positioned and oriented, and then read the gloss of a working standard in the mid-gloss range. If the instrument reading for the second standard does not agree within one unit of its assigned values, check cleanliness and repeat. If the instrument reading for the second standard still does not agree within one unit of its assigned value, repeat with another mid-range standard. If the disparity is still more than one unit, do not use the instrument without readjustment, preferably by the manufacturer.

10. Procedure

10.1 Position each specimen in turn beneath (or on) the glossmeter. For specimens with brush marks or similar texture effects, place them in such a way that the directions of the marks are parallel to the plane of the axes of the incident and reflected beams.

10.2 Take at least three readings on a 3 by 6-in. (75 by 150-mm) area of the test specimen. If the range is greater than two gloss units, take additional readings and calculate the mean after discarding divergent results as in the section on Test for Outliers of Practice D 3980. For larger specimens, take a proportionately greater number of readings.

11. Diffuse Correction

11.1 Apply diffuse corrections only upon agreement between the producer and the user. To apply the correction,

subtract it from the glossmeter reading. To measure the correction, illuminate the specimen perpendicularly and view at the incident angle with the receiver aperture specified in 6.2 for the corresponding geometry. To compute the correction, multiply the 45°, 0° directional reflectance of the specimen, determined in accordance with Test Method E 97, by the effective fraction of the luminous flux reflected by the perfect diffuse reflector and accepted by the receiver aperture. The luminous flux entering the receiver aperture from the perfect white diffusor would give the following gloss indications for each of the geometries:

Geometry, °	Gloss of Perfect White Diffuser
60	2.5
20	1.2
85	0.03

12. Report

12.1 Report the information following:

12.1.1 Mean specular gloss readings and the geometry used.

12.1.2 If uniformity of surface is of interest, the presence of any specimen that exhibits gloss readings varying by more than 5 % from their mean.

12.1.3 Where preparation of the test specimen has been necessary, a description or identification of the method of preparation.

12.1.4 Manufacturer's name and model designation of the glossmeter.

12.1.5 Working standard or standards of gloss used.

13. Precision

13.1 On the basis of studies of this test method by several laboratories in which single determinations were made on different days on several ceramic tiles and painted panels differing in visually perceived gloss, the pooled within-laboratory and between-laboratories standard deviations were found to be those shown in Table 2. Based on these standard deviations, the following criteria should be used for judging the acceptability of results at the 95 % confidence level:

13.1.1 *Repeatability*—Two results, each of which are single determinations obtained on the same specimen by the same operator, should be considered suspect if they differ by more than the maximum acceptable differences given in Table 3.

TABLE 2 Standard Deviation of Gloss Determinations

Type of Gloss,°	No. of Ceramic Tiles	Degrees of Freedom		Standard Deviations	
		Within-Laboratory	Between-Laboratories	Within-Laboratory[A]	Between-Laboratories[B]
20	4	40	34	0.4	1.2
60	4	40	34	0.3	1.2
85	2	16	6	0.2	0.6

Type of Gloss,°	No. of Painted Panels	Degrees of Freedom		Standard Deviations	
		Within-Laboratory	Between-Laboratories	Within-Laboratory[A]	Between-Laboratories[B]
20	8	80	72	0.6	2.2
60	22	220	136	0.3	1.2
85	6	48	18	0.3	2.4

[A]Single determinations.
[B]For means of three determinations.

TABLE 3 Maximum Acceptable Differences for Two Results

Type of Gloss,°	Repeatability (Within Laboratories)[A]		Reproducibility (Between Laboratories)[B]	
	Ceramic Tiles	Painted Panels	Ceramic Tiles	Painted Panels
20	1.1	1.7	3.5	6.4
60	0.9	0.9	3.4	3.5
85	0.6	0.8	2.0	7.2

[A]Single determinations.
[B]For means of three determinations.

13.1.2 *Reproducibility*—Two results, each the mean of three determinations, obtained on the same specimen by different laboratories should be considered suspect if they differ by more than the maximum acceptable differences given in Table 3. This does not include variability due to preparation of panels in different laboratories.

NOTE 5—For some types of paint, particularly semi-gloss, the measured gloss is affected by method of film preparation and drying conditions so that the reproducibility of results from such materials may be poorer than the values given in Table 3.

14. Keywords

14.1 appearance; directional reflectance factor; gloss; goniophotometry; high gloss; relative luminous reflectance factor; specular gloss

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